



DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION SPECIFICATION

ALTIMETER SETTING INDICATOR, DIGITAL READOUT SYSTEM

1. SCOPE AND CLASSIFICATION

1.1 Scope.- The Altimeter Setting Indicator (ASI) system specified herein shall measure atmospheric pressure and convert this reading into ASI digital displays. The altimeter setting is transmitted to the pilot to be used in the proper setting of the barometric pressure dial of altimeters in aircraft. The system shall provide multiple outputs which permit transmitting this information to more than one user.

1.2 Classification.- The ASI covered by this specification shall be one type with an adjustable range of elevation from minus (-) 100 to 8,000 feet.

1.2.1 System.- The ASI system shall consist of the following:

- (a) Basic panel mounted sensor, power supply, data translation and display
- (b) Digital display panel
- (c) Binary coded decimal (BCD) to Frequency Shift Keying (FSK) encoder
- (d) FSK to BCD decoder

2. APPLICABLE DOCUMENTS

2.1 FAA documents.- The following FAA specifications and standards, of the issues specified in the invitation for bids or request for proposals, form a part of this specification.

2.1.1 FAA specifications

FAA-D-2494/1 and 2	Instruction Book, Manuscripts Technical: Equipment and Systems Requirements
FAA-G-1210	Provisioning Technical Documentation
FAA-G-2100/1	Part 1, Electronic Equipment, General Requirements; Basic Requirements for all Equipments
FAA-G-2100/3	Part 3, Requirements for Equipments Employing Semi-Conductor Devices
FAA-G-2100/4	Part 4, Requirements for Equipments Employing Printed Wiring Techniques
FAA-G-2100/5	Part 5, Requirements for Equipments Employing Microelectronic Devices
FAA-E-163	Rack, Cabinet and Open Frame Types
FAA-G-2300	Panel and Vertical Chassis, Rack

2.1.2 FAA standards

FAA-STD-010	Graphic Symbols for Digital Logic Diagrams
FAA-STD-013	Quality Control Program Requirements

2.2 Military and Federal publications.- The following Military and Federal publications, of the issues in effect on the date of the invitation for bids or request for proposals, form a part of this specification and are applicable to the extent specified herein.

2.2.1 Military specification

MIL-E-17555	Electronic and Electrical Equipment, Accessories and Repair Parts; Packaging and Packing of
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2.2.2 Military standard

MIL-STD-188	Military Communication System Technical Standards
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2.2.3 Federal standard

FED STD 102	Preservation, Packaging, and Packing Levels
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2.2.4 Government Printing Office

United States Standard Atmosphere, 1962

Smithsonian Meteorological Tables

2.3 Other publications.- The following American National Standards Institute standard forms a part of this specification and is applicable to the extent specified herein.

ANSI X3.4 Code for Information Interchange (ASCII)

(Copies of this specification and other applicable FAA specifications and standards may be obtained from the Federal Aviation Administration, Washington, D.C. 20591, Attention: Contracting Officer. Requests should fully identify material desired, i.e., specification, standard, and amendment numbers and dates. Requests should cite the contract number or other use to be made of the requested material.)

(Single copies of the Military specifications and standards may be obtained from Federal Aviation Administration, Washington, D.C. 20591, Attention: Contracting Officer. Requests should cite the invitation for bids, request for proposals, or contract involved. Note that mail requests, if found acceptable, will be forwarded to a Military supply depot for filling; hence, ample time should be allowed.)

(Copies of the United States Standard Atmosphere, 1962, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20401, at the published price.)

(Copies of the ANSI X3.4 standard may be obtained from American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.)

3. REQUIREMENTS

3.1 Equipment to be furnished by the contractor.- Each ASI system furnished by the contractor shall be complete in accordance with all specification requirements.

3.1.1 Panel mounted sensor and digital translation basic unit.- The basic system shall be mounted on a standard panel in accordance with FAA-G-2300. It shall consist of a temperature regulated or temperature compensated pressure sensor, a power supply, a digital solid state data translator, a serialized digital output of ASI, a panel and chassis assembly, a four digit display of ASI, switches for adjusting the system to the site elevation, a switch for the addition of a correction into the display of ASI, and provisions for plug-in of an FSK output card.

3.1.2 Digital display panel.- The digital display panel shall consist of a four digit display of ASI, a control for varying the illumination of the

display, decoder drives, serial receiver and data latches, a power supply, a connector for the signal cable, a connector for the power cable, and a connector to the FSK interface.

3.1.3 BCD to FSK encoder.- The card with the circuitry for changing the serial binary coded decimal (BCD) signal of ASI data into an ASCII coded frequency-shift-keying (FSK) signal form.

3.1.4 FSK to BCD decoder.- The decoder shall translate the FSK signal to a BCD serial input for the displays specified in 3.1.2.

3.1.5 Instruction books.- The instruction books shall be provided in accordance with Specification FAA-D-2494 and the invitation for bids.

3.1.6 Accessories.- All units shall have suitable connectors provided for input and output leads for each mating part. All cables or power cords shall terminate in a connector and/or plug.

3.2 Definitions

3.2.1 Altimeter setting.- The altimeter setting is the actual sea level pressure based on the U.S. Standard Atmosphere. The altimeter setting is used by the pilot to set his flight altimeter and correctly indicate the height of the aircraft. If a perfectly calibrated altimeter is set to the altimeter setting indicated and existing at any given station whose elevation is designated as H_p , the pointer of the altimeter instrument shall yield an indicated altitude equal to H_p when the instrument is subjected to the pressure which exists at the elevation H_p . A discussion of altimeter setting is given in Table 65, page 269 of the Smithsonian Meteorological Tables.

3.2.2 Altimeter setting equation.- Barometric pressure readings may be converted to an altimeter setting indication in inches of mercury by means of the altimeter setting equation defined as follows:

$$P_a = P \left[1 + \left(\frac{P_o^n}{T_o} \right) \frac{H_b}{P^n} \right]^{1/n}$$

Where

P_a = the altimeter setting number is equal to the relative pressure that a barometer located at sea level would measure at the reference time and geographic location;

P = the true barometric pressure, in inches of mercury, at the elevation of the altimeter setting indicator pressure sensor;

- H_b = elevation, in meters above mean sea level, of the altimeter setting indicator pressure sensor;
- P_o = standard sea level pressure = 29.921 inches of mercury;
- a = standard lapse rate in standard atmosphere = 0.0065°C per standard geopotential meter;
- T_o = standard sea level temperature adapted for use in the standard atmosphere = 288.16°Kelvin (Absolute);
- n = aR/G = constant = 0.1902546 (dimensionless);
- $1/n$ = G/aR = constant = 5.256115 (dimensionless).

Explanations of the last five symbols are given in the following publications: National Advisory Committee for Aeronautics (NACA), Report 1235, "Standard Atmosphere--Tables and Data for Altitudes to 65,800 Feet," published by the Government Printing Office (1955). Smithsonian Meteorological Tables, 6th Revised Edition, Table 65.

3.2.3 Tables of the standard atmosphere.- These tables give altitude (in feet) in the standard atmosphere as a function of pressure in inches of mercury. These tables appear in the publication NACA Report #1235, English Table IV or U.S. Standard Atmosphere, Table X.

3.2.4 Initial system.- The initial system is defined as a production line model of the product which the manufacturer will subsequently produce in fulfillment of the contract. As soon as practicable after award of the contract or order and prior to submission of any complete system for final acceptance, the contractor shall furnish the initial production system for test to determine conformance with this specification. Approval of the initial system by the activity concerned shall not relieve the contractor of his obligation to supply equipment conforming to this specification. Any changes or deviations from the initial system shall be subject to the approval of the Contracting Officer.

3.3 General design requirements.- The equipment shall be designed to comply technically with the following subparagraphs.

3.3.1 Service conditions.- The equipment specified herein shall be designed to the following standard design center values and variations required by Specification FAA-G-2100/1, paragraphs 1-3.2.22 and 1-3.2.23:

AC Line Voltage	120 V
AC Line Frequency	60 Hz

3.3.1.1 Ambient conditions.- The equipment shall be designed for operation in ambient conditions of Environment I (Specification FAA-G-2100/1, paragraph 1-1.3.2.23).

3.3.2 Mean time between failure.- System failure shall be defined as any occurrence, apart from loss of primary commercial power, which requires corrective action. Mean time between failure of the basic unit (3.1.1) shall not be less than 10,000 hours. Mean time between failure of the display (3.1.2) shall not be less than 30,000 hours.

3.3.3 Maintainability.- The system shall be designed with no mechanical gears, linkages, springs, or electro-mechanical servo-mechanisms or the like. The electrical and mechanical design shall provide for minimum maintenance with all components readily accessible.

3.3.4 Interchangeability.- Any system component (basic unit or display unit) shall be interchangeable with any other system unit of the same type. The system shall remain within the specified requirements when any system unit is interchanged with any corresponding unit.

3.3.5 Solid state circuitry.- No vacuum tubes shall be used in the system. Solid state circuitry shall be used throughout in accordance with Specification FAA-G-2100/3. Printed wiring boards shall be employed in accordance with Specification FAA-G-2100/4.

3.3.6 Integrated circuitry.- Only integrated circuits available as a standard catalog item from two or more manufacturers shall be employed. The circuits shall meet the requirements of Specification FAA-G-2100/5. Plastic encapsulated circuits may be employed with FAA approval.

3.3.7 Provision for site calibration.- Provision shall be included in the system to permit recalibration by the FAA with FAA equipment over a suitable pressure range at the site where the equipment is installed. Pressure couplings shall be provided to permit connection of ancillary equipment required to perform this calibration. The instruction book shall include specific instructions as to how this calibration shall be performed describing equipment required (including suggested type numbers) and method employed.

3.4 Accuracy and operational requirements.- The overall accuracy in inches of mercury and operational requirements for the system, consisting of basic unit including display units shall conform to the requirements of the following subparagraphs:

3.4.1 Accuracy requirements.- Altimeter setting readings provided by the basic unit shall differ from the computed altimeter setting by no more than ± 0.005 inches of mercury for any value in the range of the instrument. The computed altimeter setting shall be determined from the tables referred to in 3.2.3 or by application of the formula referred to in 3.2.2.

3.4.2 Altimeter setting range.- The system shall sense and display the altimeter setting to the specified degree of accuracy thru the altimeter

setting range of 28.00 to 31.00 inches of mercury for each elevation setting of the sensor. Extended range operation to 27.00 and 32.00 is required with degraded accuracy.

3.4.3 Elevation range.- The system shall operate at all elevations between 100 feet below and 8,000 feet above mean sea level while maintaining the altimeter setting indication with the specified degree of accuracy.

3.4.4 Display requirements.- The altimeter setting indication shall be displayed to four significant digits with no degradation of accuracy in the altimeter setting indicator and shall be updated approximately once each minute.

3.5 General mechanical and electrical requirements

3.5.1 Rack mounting.- The basic unit shall be designed for rack mounting and be capable of installation in a relay rack, cabinet type, constructed in accordance with Specification FAA-E-163. No rack shall be provided as an item of this specification. A unit outline drawing is provided as Figure II.

3.5.2 Panel and chassis construction.- The basic unit shall be constructed on an aluminum rack panel with appropriate chassis assembly and in accordance with Specification FAA-G-2300. Chassis material shall be aluminum alloy. Thickness of material and method of forming and reinforcing shall be such as to result in a rigid chassis assembly capable of supporting the equipment without twist or sag.

3.5.3 Connections and cabling.- All connections and cabling to the basic unit shall be made from the rear of the chassis. Front panel connections are not permitted.

3.5.4 Positive lock connectors.- All external connectors supplied for interconnecting cables shall be of the positive lock type, of the appropriate style and class.

3.5.5 AC line receptacle and attachment cord.- A 120 V (nominal) AC supply line, AC ground-type, three pole, male, recessed receptacle shall be provided and mounted on the right rear of the chassis of the basic unit. Receptacle and attachment cord shall comply with Specification FAA-G-2100/1, paragraph 1-3.10.2.

3.5.6 Panel requirements.- The basic unit (3.1.1) and the display panels (3.1.2) shall be in accordance with the following general requirements:

3.5.6.1 Markings.- Each panel shall be suitably identified by panel markings in accordance with Specification FAA-G-2100/1.

3.5.6.2 Color.- Each basic panel shall be painted in accordance with Specification FAA-G-2100/1, (Federal Std. 595, Color No. 30372, brown). Each display panel shall be Color No. 30117, brown.

3.5.6.3 Nameplate.- A nameplate shall be mounted on the basic panel surface. A nameplate shall be placed on the cover of the display unit. The nameplates shall be in accordance with Specification FAA-G-2100/1, paragraphs 1-3.13 thru 1-3.13.3.

3.6 Performance requirements.- The following requirements are applicable to the entire system.

3.6.1 Error detection capability.- The basic unit shall provide computation and indicator serial transmission error detection. The unit shall automatically perform this error test prior to each "once per minute ASI update."

3.6.1.1 Error test output.- The basic unit shall detect the error condition and inhibit display update.

3.6.1.2 Local ASI indication.- The basic unit shall utilize the serial transmission signals to provide error sensed or corrected indications identical to the coded output provided to the display panels. The self-test ASI computation value and the fixed constant shall be equal to allow the basic unit to compute and output the functional ASI value.

3.6.1.3 Error detection annunciation.- Upon detection of error test computation and/or serial transmission error detection, the basic unit shall output a serial word to cause the letter "E" to be displayed in all digits of the ASI indicator and on all digits transmitted through the modem interface card.

3.6.1.4 Maintenance display.- A switch inside the basic unit panel shall cause an "E" signal to be displayed at all stations. In the ASI position, the display shall present the functional ASI serial output to be used in the maintenance check.

3.6.1.5 Altimeter setting indicator fail/safeness.- If the altimeter setting indicator fails to receive two consecutive transmissions from the basic unit (or no serial output for approximately 2.5 minutes), the display shall be blanked except for the most significant digit where an "E" will appear and the decimal point.

3.6.2 Maintenance check indication.- The letter "E" shall be displayed on the most significant digit of the Digital Display when the equipment is being tested by maintenance personnel. In this case, the "E" display shall be initiated by a switch inside the basic unit panel.

3.6.3 Warmup requirements.- The basic unit (3.1.1) shall be performing all functional parameters of this specification within 30 minutes of the time the unit has been connected to a 120 VAC 60 Hz power source. Application of power to this unit shall be controlled by a power on-off switch located on the front panel. The serial output during warmup shall be "EE.EE." The display panel (3.1.2) shall perform all functional parameters of this specification within 1 minute of the time the unit power cord has been connected to a 120 VAC 60 Hz power source and receipt of a serial output from the basic unit. Until the receipt of a serial output, the unit display shall be "E."

3.7 Basic unit.- A basic unit (3.1.1) providing the functions described herein and meeting all applicable requirements of the following subparagraphs shall be supplied:

3.7.1 Interface.- The basic unit shall interface with the input pressure and the display panel. The signal interconnect diagram is shown in Figure V.

3.7.2 Venting of sensor.- Provisions shall be made to vent the sensor to the outside. A flare fitting 1/8" MPT to 3/16" SAE flare, shall be provided to permit connection of the unit by 3/16 inch diameter tubing.

3.7.3 Sensor type.- The sensor shall be an absolute pressure measuring device with no mechanically connected moving parts.

3.7.4 Sensor accuracy.- The sensor shall measure atmospheric pressure with an accuracy of resolution which will provide the specified system accuracy when the ASI reading is developed from the local atmospheric pressure. The corresponding atmospheric pressure shall be measured by comparison with a pressure standard, the accuracy of which is at least ± 0.001 inches of mercury. The sensor input shall be capable of withstanding an overpressure input of 40 inches of mercury or an underpressure of 4 inches of mercury without damage or recalibration.

3.7.5 Station altitude information.- The basic unit (3.1.1) shall include four detented thumb wheel switches for setting station elevation information as required over the specified operating range. These switches shall be located accessible from the front, but not directly on the front panel.

3.7.6 Basic unit output.- The output of the basic unit shall be a serial data word (Figure III) which is representative of altimeter setting values. A switch shall be provided to change the display by ± 0.04 inch of mercury

3.7.6.1 Transmission system.- The display data shall be transmitted over one two-wire circuit. The data, clock and word synchronization shall be contained in the one self-synchronizing wave form.

3.7.6.2 Transmitter output voltage.- The transmitter output positive and negative voltage levels shall be per MIL-STD-188, paragraph 7.2.1.1.

3.7.6.3 Output capability.- The serial output shall be capable of driving 10 digital displays. The serial output shall drive a total system resistance of 1,200 to 12,000 ohms. The serial output shall drive a total system capacitance of 500 to 15,000 picofarads.

3.7.6.4 Optional frequency-shift-keying (FSK) output.- When specified, the basic unit shall provide an ASCII coded FSK output (paragraph 1.2.1(c)) of the ASI value for use over telephone line circuits. The transmission frequency range shall be 1170/1070; the receiver range shall be 2225/2025. The least significant bit shall be transmitted first.

3.7.8 Panel layout.- The basic unit panel shall be provided with the following: on-off switch, pilot light, output display, and fuse in accordance with Specification FAA-G-2100/1. Panel layout is shown in Figure II.

3.7.9 Local digital readout.- The basic unit panel shall provide a digital readout of the altimeter setting indication.

3.7.10 Alternate outputs.- Output connector shall be available on all basic units in the rear at the basic unit for connecting the optional FSK output lines when the unit has this option.

3.8 Digital display unit

3.8.1 Description and outline.- The digital display shall be an all solid state electronic display utilizing four seven-segment numeric displays to represent the altitude setting indicator as transmitted by the basic unit. The indicator shall be suitable for panel mounting configured as shown in Figure IV.

3.8.2 Digital display.- The digital display readout shall consist of a seven-segment display of plug-in character elements having mechanical characteristics which permit insertion into the display panel from the front, and electrical characteristics which permit operation in conformance with this specification. The display shall consist of seven-segment type numerals with a nominal character height of 0.3125 inches. The character center line spacing will be 0.375 inch. The viewing angle shall be ± 60 degrees from the perpendicular in both the horizontal and vertical axis. (Also see 3.8.9).

3.8.3 Characteristics of readout.- The digital readout shall consist of four individual digit displays, with a fixed decimal point between the second and third digit. The digits shall have the capability of displaying the letter "E" in addition to numerals. The display shall have capability of presenting altimeter setting readings of 27.00 to 32.00 inches of mercury. The fixed decimal point shall remain illuminated when the display is otherwise blanked.

3.8.4 Wiring of display unit.- A male connector shall be mounted on the rear of the display unit. This connector shall provide input for information from the basic unit. The display unit shall be powered independently of any other weather display panel. An AC power cable and plug in accordance with Specification FAA-G-2100/1, paragraph 1-3.10.2, five feet long, shall be provided.

3.8.5 Preparation of display unit.- Each indicator (3.1.2) shall be packaged and delivered as a complete assembly ready for use.

3.8.6 Signal input.- The display unit shall receive and display the output of the basic unit (paragraph 3.7 of this specification).

3.8.7 Input requirements.- Each display unit input resistance shall be 1,200 ohms minimum, and its input capacitance shall be 100 picofarads maximum.

3.8.8 Panel layout.- The display panel layout shall be provided in accordance with Figure IV.

3.8.9 Intensity of readout.- The intensity of the readout shall be sufficient to permit easily reading the display from its background at a distance of 20 feet under ambient illumination conditions ranging from darkness to 4,000 foot candles. An intensity control shall be provided on the front of the digital display panel. Readouts shall remain clear and legible at all intensity control conditions. For demonstrating compliance with this requirement at maximum illuminating conditions the viewing angle shall be normal to the display and the intensity of the display shall be variable from the maximum intensity to extinction. The extinction position shall be at the extreme counterclockwise position of the control.

4. QUALITY ASSURANCE PROVISIONS

4.1 Quality control provisions.- The contractor shall provide and maintain a quality control program in accordance with FAA-STD-013. All tests and inspection made by the contractor shall be subject to Government inspection. The term "Government inspection," as used in this specification means that an FAA representative will witness the contractor's testing and inspection, and will carry out such visual and other inspection as deemed necessary to assure compliance with contract requirements. Four classes of tests are required as listed below.

4.2 Contractor's preliminary tests.- Prior to the time the contractor notifies the Government that the initial production system is ready for inspection, and to demonstrate readiness for inspection, he shall make one complete set of all tests required by this specification. These

preliminary tests shall be made on one production system or on one prototype (preproduction) model. The contractor's preliminary tests do not constitute any of the regular design qualification tests, type tests, or production tests required by the equipment specification or by the referenced general specifications.

4.2.1 Preliminary test data.- The contractor shall submit to the Government Contracting Officer a certified copy of the test data covering all the contractor's preliminary tests. This test data may be submitted along with the proposed test procedures and forms under FAA-STD-013, but in any case the test data shall be submitted not less than 10 work days in advance of the date set for inspection pursuant to paragraph 4.2.2.

4.2.2 Notification of readiness for inspection.- After submission of the preliminary test data, and when the contractor has one or more production systems completed, i.e., equipments produced to meet all specification requirements, he shall notify the Government Contracting Officer in writing that he is ready for Government inspection. Such notification shall be given in time to reach the Contracting Officer not less than five work days before the contractor desires inspection to start.

4.3 Design qualification tests.- The following tests (and verification) shall be made on a regular production system selected by the Government Contracting Officer in accordance with Specification FAA-G-2100/1, paragraph 1-4.3.2:

Rating verification parts and materials (4.3.1)

Other general specification tests (4.3.2)

Design qualification tests in this specification

4.3.1 Rating verification parts and materials.- Measurements or calculations, or both, shall be made in order to establish that the electrical and electro-mechanical parts, wire and insulation materials used in the equipment will not be subjected to voltage, currents, power dissipation, and temperature in excess of the derated values permitted by this specification. The following is a basic list of parts and materials to which the foregoing applies, other electrical and electro-mechanical parts used in the system shall also be subject to the foregoing. (See Specification FAA-G-2100/1, paragraph 1-4.3.2.1).

Capacitors

Crystals

Fuses

Insulators

Insulating materials

Relays

Resistors

Switches

Transformers

Wire

Connectors

Semiconductor Device

(Transistors,

Rectifiers, Diodes,

Displays, etc.)

4.3.2 Other general specification tests.- Tests shall be made in order to establish that the requirements of the following paragraphs of Specification FAA-G-2100/1, wherever applicable, are being met:

Discharge of capacitors	1-3.5.5
Ground potentials	1-3.5.9.1 to 1-3.5.9.3
AC line input resistance to ground (service conditions of temperature and humidity)	1-3.6.3
Circuit protection (at minimum line voltage in service conditions range)	1-3.7
Performance requirements and tolerances specified in Parts 3, 4, and 5 of Speci- fication FAA-G-2100/1, where such parts are applicable.	

4.3.3 Special design qualification tests.- The tests of the ASI system shall be conducted by the contractor at a site or facility approved by and in the presence of a Government inspector. Error shall be determined by comparison with a standard mercurial barometer or test standard of equivalent accuracy which shall be connected into the same pressure line. The displayed values shall be compared to the corrected altimeter setting indications determined from this pressure standard. The calibration tests shall be conducted at room temperatures for this test (65° - 90°F), but the room temperature shall not vary more than 8°F during the test period. The sensor shall be acclimated to the test conditions by an adequate (one to two hours) time period to stabilize and if the design requires mechanical flexing of parts the sensor shall be cycled a minimum of five times through the pressure range prior to testing.

4.3.3.1 Calibration tests.- The ASI shall be tested at the zero (0) elevation and repeated at the 8,000 feet elevation setting. The tests shall be at selected points not greater than one-half inch of mercury apart through the pressure range of 28.00 thru 31.00 inches of mercury. The tests shall be conducted both ascending and descending with test points being duplicated within ±0.002 inch mercury. Additional tests shall be made for elevation settings of 2,000, 4,000, and 6,000 feet elevations with test points selected at the lower, center, and upper limits of the pressure range (See 3.4, etc.).

4.3.3.2 Compatibility tests.- One complete assembly shall be tested with one to ten displays or a resistive load of 12,000 ohms and capacitance of 15,000 picofarads, with the FSK converter card, a simulated load of 10 miles of telephone line, a FSK decoder, and a digital display in the circuit. The two digital displays should follow the display in the basic panel as varying pressure and elevation values are applied.

4.3.3.3 Controls.- The ASI system shall be tested for responsiveness to the elevation switches variation. The displays shall be tested for legibility at varying settings of the illumination control and repeated for ambient illumination conditions ranging from darkness to 4,000 foot candles.

4.3.3.4 Error detection capability.- The system shall be tested for computation and serial transmission errors. The error test operation and indication shall be verified. The function of the error test switch in 3.6.14, and the resulting indications within the system shall be tested. The maintenance and warmup indications of 3.6.2 and 3.6.3 shall be tested.

4.4 Type tests - normal conditions.- Utilizing the procedure established in Specification FAA-G-2100/1, paragraph 1-4.3.3, et. seq. The following type tests shall be conducted under normal test conditions:

4.4.1 System compatibility.- One complete system with a simulated or actual load equivalent to ten digital display panels shall be tested as a unit. The numerals displayed by the digital display panels shall coincide with that displayed in the basic panel for each pressure input or any change of the elevation input.

4.4.2 Intensity of readout display.- The contractor shall demonstrate that the display is plainly legible when observed under lighting conditions varying from 1 to 4,000 foot candles. (See 3.8.9).

4.4.3 Elevation selection switches.- The contractor shall demonstrate that the ASI system is responsive to any change in elevation setting.

4.4.4 Alarm system.- The contractor shall demonstrate that the ASI system displays the alarm symbol whenever an abnormal condition occurs or maintenance check is made.

4.4.5 Panel illumination.- Variation of illumination at the remote display panel shall be demonstrated.

4.5 Type tests.- normal test conditions except voltage and frequency.- The following tests are to be conducted under normal test conditions with the exception that tests shall be conducted under the lower and upper extreme conditions of voltage and frequency and combination thereof.

4.5.1 System compatibility.- Refer to 4.4.1 above.

4.5.2 Intensity of readout display.- Refer to 4.4.2 above.

4.5.3 Elevation selection.- Refer to 4.4.3 above.

4.5.4 Alarm system.- Refer to 4.4.4 above.

4.5.5 Panel illumination.- Refer to 4.4.5 above.

4.6 Production tests.- The following production tests are to be conducted on each ASI system or individual component thereof.

4.6.1 ASI readout display.- Each readout in the basic or remote panel shall be checked to determine that each digit of the display responds properly to the initiating signal.

4.6.2 Alarm circuitry.- The system shall be checked to determine that each display indicates the proper indication or else the system flashes a failure.

5. PREPARATION FOR DELIVERY

5.1 General.- Preservation, packaging, packing, and marking shall be in accordance with the requirements of Specification MIL-E-17555. Levels of protection as defined in Fed. STD-102 shall be as specified by the procuring activity (See 6.2).

5.2 Preservation and packaging.- Each basic system, complete with instruction books, shall be individually preserved and packaged in accordance with the Level B or C requirements of Specification MIL-E-17555 (See 6.2). Each digital display, encoder, and each decoder shall be individually preserved and packaged at the specified level. Each packaged item shall be individually marked for identification and stocking.

5.3 Packing.- Items preserved and packaged as above shall be packed in exterior type containers, selected from appropriate tables of MIL-E-17555, conforming to the applicable levels of packing specified (See 6.2). The shipping containers shall be marked in accordance with the procurement documents.

6. NOTES

6.1 Note on information items.- The paragraphs below are only for the information of the Contracting Officer and the Requisitioning Office intended to assist in formulating a contract. They are not contract requirements, nor binding on either the Government or the contractor except to the extent that they may be specified elsewhere in the contract as such. Any reliance placed by the contractor on the information in these subparagraphs is wholly at the contractor's own risk.

6.2 Ordering data.- Requests, requisitions, schedules, and contracts or orders should specify the following:

- (a) Title, number, and date of this specification.
- (b) The number and type of the units to be supplied (3.1 thru 3.16)

- (c) The requirement and location for the testing of the initial system (3.2.2 and 4.3).
- (d) Where the contractors preliminary test data will be delivered (4.2)
- (e) Where and when the test plans required under FAA-STD-013 shall be delivered (4.2.1).
- (f) Where and when the notice of readiness for inspection shall be furnished (4.2.2).
- (g) The level of preservation and packaging required (5.2).
- (h) The level of packing required (5.3).

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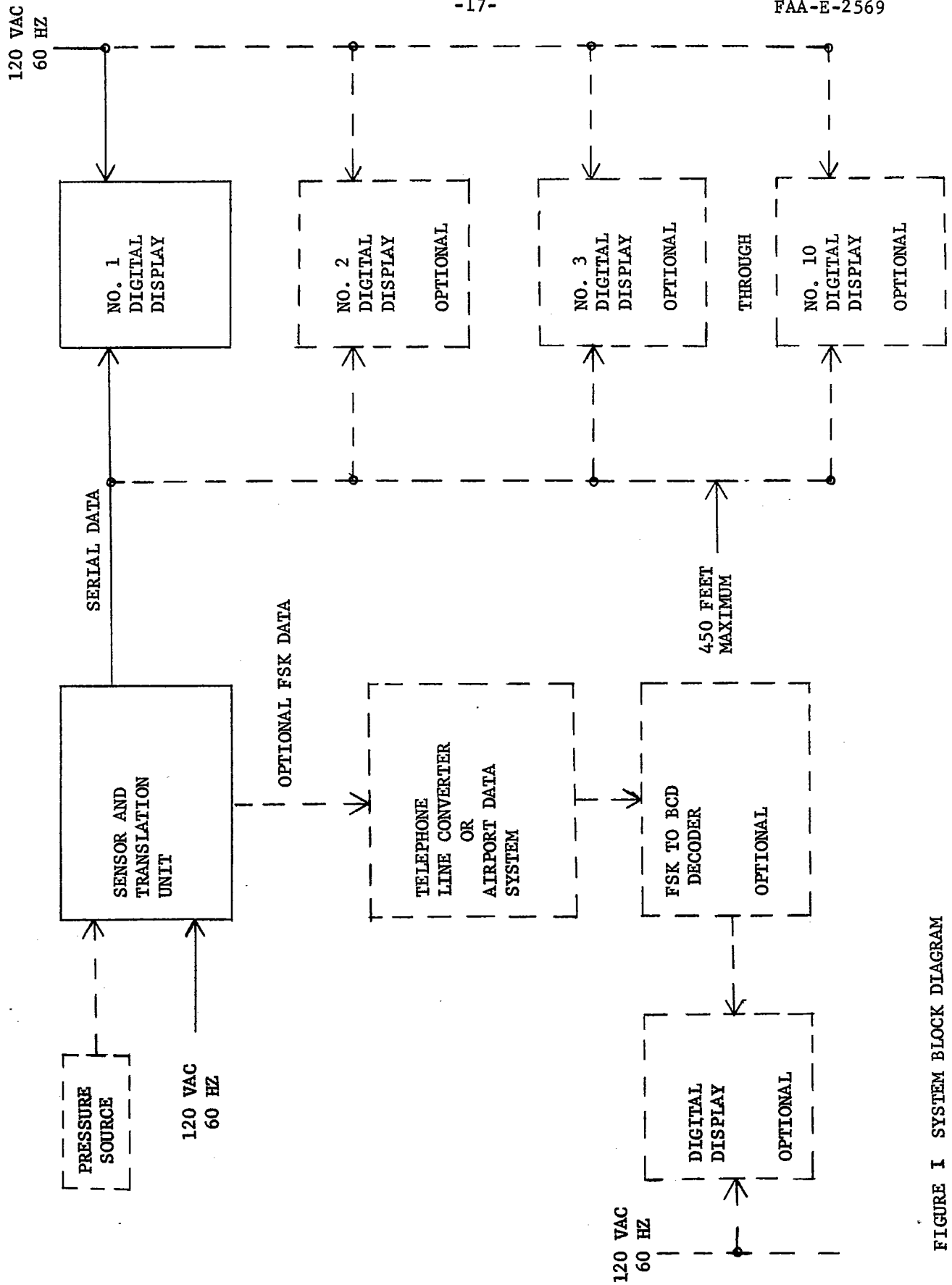
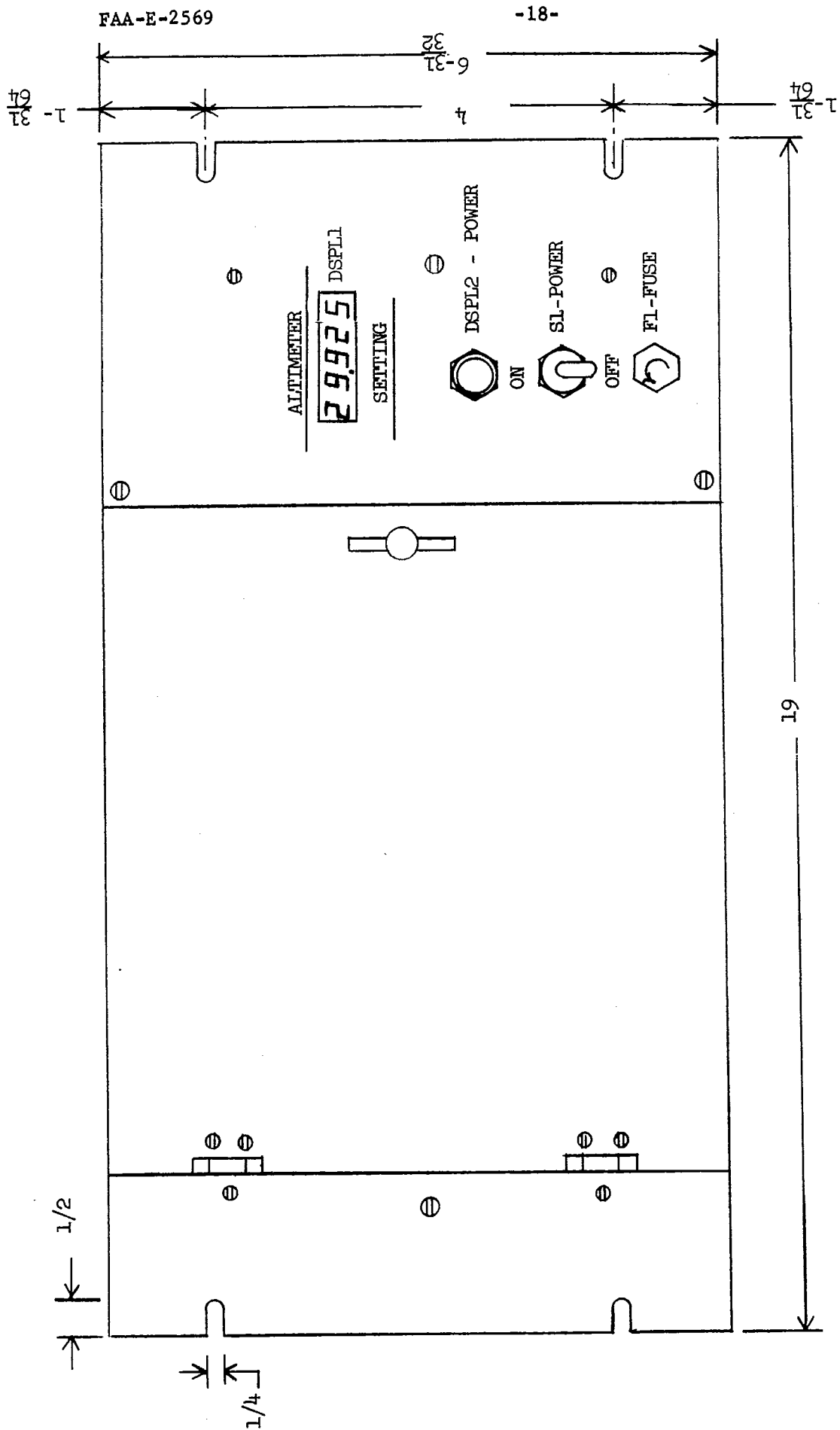


FIGURE 1 SYSTEM BLOCK DIAGRAM



FRONT VIEW

FIGURE 11 - SENSOR AND TRANSLATION UNIT

BCD Character Number	4	3	2	1
BCD Character Weight (In. of Hg)	10.00	1.00	0.10	0.01
BIT NUMBER	15 14 13 12	11 10 9 8	7 6 5 4	3 2 1 0
BIT Weight (In. of Hg)	80.00 40.00 20.00 10.00	8.00 4.00 2.00 1.00	0.80 0.40 0.20 0.10	0.08 0.04 0.02 0.01
Examples 29.92 In. of Hg	0 0 1 0	1 0 0 1	1 0 0 1	0 0 1 0
Code to Command* "E" in Character 4	1 1 1 0	Ø Ø Ø Ø	Ø Ø Ø Ø	Ø Ø Ø Ø
Warmup & Failure "E" in all Characters	1 1 1 0	1 1 1 0	1 1 1 0	1 1 1 0
Self-Test Output**	1 0 D D	D D D D	D D D D	D D D D

FIGURE III - ALTITUDE INDICATOR SETTING
SIXTEEN BIT
DATA WORD

* Symbol Ø indicates Bit
Can be either "1" or "0".

** Symbol D indicates Data Bits

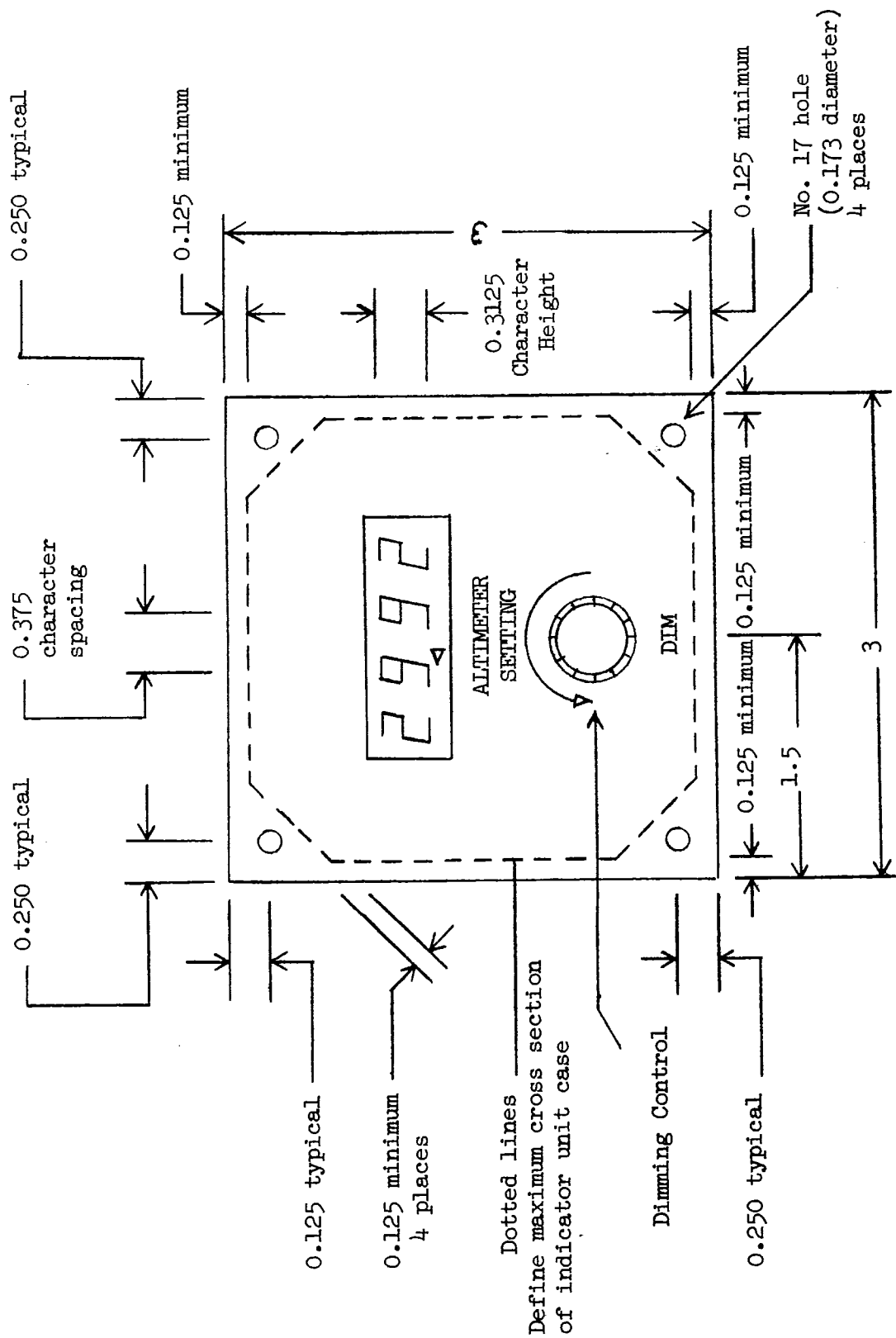
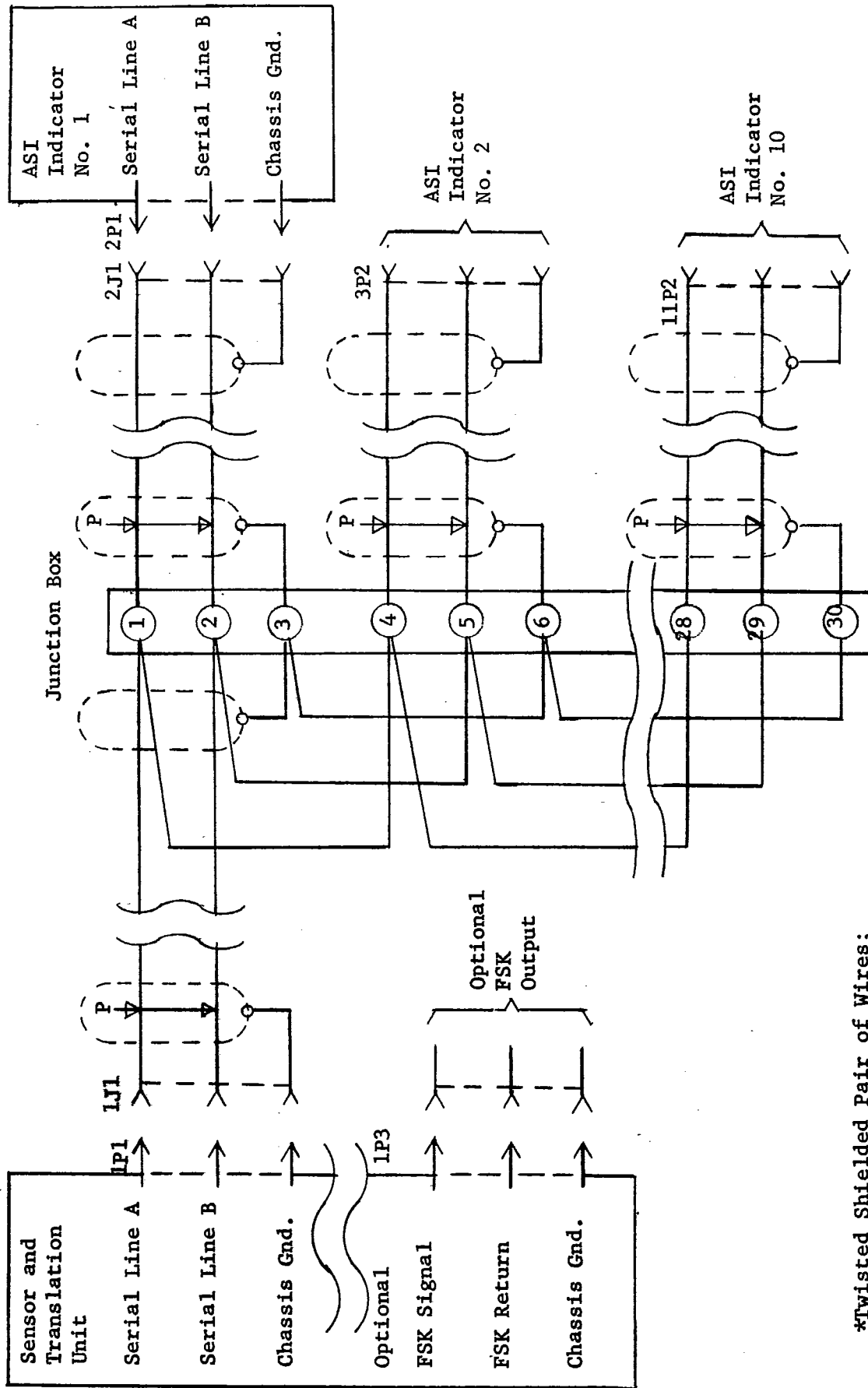


FIGURE IV - SECTION A-A FRONT VIEW



*Twisted Shielded Pair of Wires;
wire size No. 24 or lower.

FIGURE V - SIGNAL INTERCONNECTION DIAGRAM